factorial effects thus illustrated is one that, we are sure, awaits us in many comparable instances. Obviously, such interference might operate either by reducing the number of the seeds or by reducing their size; and in some plants, doubtless, the one effect will be found, and in other cases the other. The discussion of this and various other examples of complex results is unconventional and always fruitful.

The book is one which well illustrates the mental attitude of the investigator to whom problems appeal chiefly by virtue of their difficulty. Had Mr. Balls stuck to any one of the lines he has begun, no doubt he could have gone much further along it; but so soon as anything like a solution is in sight he would rather start another chase. This is not unfriendly criticism: for many who can follow there are few who can begin, and others will some day make something of the various beginnings here left unfinished. The real objection to this book is that it is in outward form at least a *book*. The only thread of coherence running through it is that the miscellaneous embryo treatises it contains were begotten in Mr. Balls's mind by the cotton plant. So, in the same way, the common fowl has been the point of departure for lucubrations on the origin of the mesoblast, on poultry-breeding for the table, on coccidiosis, on the food-value of cereals, &c., but though it may be good for a man to keep all these topics dancing through his own head, no real purpose is served by amalgamating them into one volume. It was to meet such cases that publication in journals was invented. W. B.

THE ENERGY SIDE OF NUTRITION.

Nutritional Physiology. By Prof. P. G. Stiles. Pp. 271. (Philadelphia and London: W. B. Saunders Co., 1912.) Price 6*s*. net.

ALTHOUGH Prof. Stiles's little book is entitled "Nutritional Physiology," it is really an elementary treatise on the whole realm of physiology, though special attention is directed to digestion, absorption, and metabolism. Its keynote is the word "energy," and the living body is regarded from the point of view of an energy-transformer. The work is dedicated to Prof. Graham Lusk, of New York, and his influence can be easily traced in the chapters which deal with metabolism.

It is not possible to regard the book as a mere addition to the already numerous primers of physiology; it is something beyond this, although it makes no pretensions to being anything profound. It can be read with profit by the junior student, and still more by the senior student, and even the professed physiologist. Old truths are often put in new ways, and so fresh light is shed upon familiar problems. The language is often quaint and original, and the numerous analogies selected for explaining physiological truths are apt and well selected. Take the following as an example:

"The regulating action of the liver and the muscles upon the carbohydrate distribution may be paralleled, in part at least, by an analogy. Let us compare the active tissues to a mill turned by the waters of a stream. The water supply to the mill is to be compared with the sugar supply to the cells, which derive their energy from it. A meal is to the body as a storm is to the mill-stream—it adds to the volume of the power-producing element. The dam by the mill is like the kidney in its relation to the accumulated store," and so the parable runs on; it is unnecessary to quote more of it here.

The book contains the inevitable chapter on alcohol; this is written in a moderate strain, and may, perhaps, be viewed with disfavour by the extreme teetotaller because it is not intemperate. As one reads it, one almost feels that its author was writing it because he had to, but was protesting all the time inwardly against the American law which excludes all physiological books from scholastic institutions which do not obey the tyrannical behests of the party in power.

W. D. H.

CHEMISTRY: PURE AND APPLIED.

(1) *Fatty Foods, their Practical Examination*. A Handbook for the Use of Analytical and Technical Chemists. By E. R. Bolton and C. Revis. Pp. xii+371. (London: J. and A. Churchill, 1913.) Price 10*s*. 6*d*. net.

(2) *Der Kautschuk*. Eine kolloidchemische Monographie. By Dr. R. Ditmar. Pp. viii+140. (Berlin: Julius Springer, 1912.) Price 6 marks.

(3) *Modern Inorganic Chemistry*. By Dr. J. W. Mellor. Pp. xx+871. (London: Longmans, Green and Co., 1912.) Price 7*s*. 6*d*.

(4) *A First Class-Book of Chemistry*. By E. Barrett and Dr. T. P. Nunn. Pp. iv+124. (London: A. and C. Black, 1912.) Price 1*s*. 6*d*.

(5) *Elementary Applied Chemistry*. By L. B. Allyn. Pp. xi+127. (Boston and London: Ginn and Co., n.d.) Price 3*s*.

(6) *Trattato di Chimico-Fisica*. Traduzione Italiana con note del Dott. M. Giua. By Prof. H. C. Jones. Pp xx+611. (Milano: Ulrico Hoepli, 1913.) Price 12 lire.

(1) THE analytical examination of edible fats and oils is increasing in importance and in difficulty day by day. At least sixteen natural oils must be taken into consideration, and, when mixtures of these are presented for examination,

the task of determining their nature and origin is one that is almost beyond the range of ordinary analytical methods. In addition to the natural oils and fats it is necessary now to take into account the artificial products obtained by reducing them by hydrogen in presence of nickel; although these are only rarely mentioned, their preparation has already become an extremely important industry, which has grown to maturity at a very rapid rate and almost unobserved by the general public.

The "Handbook" of Messrs. Bolton & Revis has the merit of dealing with the examination of oils and fats exclusively from the point of view of their utility as food products. They have therefore been able to treat this branch of the subject with great thoroughness in a book of very modest dimensions. As they have had many years of experience in carrying out the tests which they describe, their conclusions are entitled to be received with respect and regarded as authoritative. This statement applies not only to their selection of the tests which are most suitable, but also to the rejection of others which are less suitable or even seriously faulty; as they remark in the preface, "omission of a method may often be better evidence of the knowledge of it than its presentation." The book is well illustrated and attractively printed; its utility will not be diminished by the fact that it has not passed through the hands of a literary editor, and bears the impress of the laboratory rather than of the classroom or the study.

(2) Dr. Ditmar's monograph on rubber is characterised by the scientific character of its treatment of a technical subject. At the head of the preface the statement is set out that "The essence of a colloid is instability: for this reason life is linked to the colloidal state. Πάντα ῥεῖ." The view of Heraclitus that "Everything is in a state of flux" is particularly applicable to the colloidal state, and has much to do with the inherent quality of "perishing," which is so serious a limitation to the usefulness of rubber. The importance of this "perishing" is shown by the fact that the author, in his chapter on the "Regeneration of Rubber," gives a list of nearly 200 patents, nearly all of which have been taken out during the last ten years.

Attention is directed to the great importance of the coagulation processes as affecting the nature of the product. In the case of synthetic rubber the aim must be to secure a highly polymerised product: the polymerised isoprene of the Elberfeld works possesses these qualities, but the polymerised butadiene resembles glue and can only be used as a "blender" or adulterant. It is impossible in a brief notice to discuss the vast amount of valuable information that has been brought together in this monograph, but it may be commended without reservation to the attention of all those who are interested in rubber, either as a technical product or as material for the study of colloid chemistry.

(3) Dr. Mellor's "Modern Inorganic Chemistry" is one of the most original of the text-books that have been published in recent years. Its very originality will probably limit its usefulness as a text-book for beginners, who would probably be well advised to acquire the rudiments of their knowledge from some more conventional source. But for a student who has already acquired a sound knowledge of inorganic chemistry, and is wondering in what way he may best add to it, it would be difficult to suggest a volume more calculated to impart new ideas and increased information than Dr. Mellor's book. It would serve admirably as a text-book of inorganic chemistry to cover the gap between the requirements of an intermediate and final B.Sc. examination.

The *four* crystalline forms of sulphur have at last been able to secure equal recognition in a text-book, and in the course of two pages the modern views of the composition of steel are effectively summarised. Little monographs such as these, embodying the results of recent researches, are of frequent occurrence and cover a very wide range of topics. On the other hand, the historical aspects of chemistry receive full recognition, nearly every statement of importance being accompanied by the name of the author who first discovered the facts and the date of the discovery.

(4) It is a matter of interest to receive a text-book of chemistry bearing on its title-page the names of a science master and an "examiner in education." The book that they have compiled is as a whole very logical and satisfactory, and includes incidental references to several phenomena which can be described in simple terms, but which have not previously found their way into elementary text-books. Amongst these the distillation of petroleum, the manufacture of linoleum, and the liquid-air process for separating oxygen may be mentioned.

The authors appear to be unaware of the historical aspects of their subject. There is really no need to use such a term as "soda gas" when Black's name of "fixed air" is available as a description of the gas which does not introduce prematurely to the student a statement of the presence of carbon in it. The authors have also been obliged to confess the illogical character of their action in describing the gas as "carbon *dioxide*" in chapter xvi. when they are unable even to attempt an explanation of the prefix until they reach chapter xxv.; even then they are not in a position to give any explanation which would be recognised as valid by any serious student of chemistry. Here again the lack of logical sequence might have been avoided by describing the gas as "carbonic anhydride"; even "carbonic acid gas" would be an improvement on "carbon dioxide" under the conditions imposed by the elementary character of the course.

(5) The American book on "Elementary Applied Chemistry" bears many signs of its country of origin, including a brief introduction written in the style of a "display advertisement." On the very first page of the book the student is required to make a note of his first chemical experiment as follows:

> Copy and sign the following statement:
> I hereby certify that a mixture called Tonsillitis Specific and examined by me contains
> Name
> Date

The mixture is one of sulphur and sugar, to be prepared *ad hoc* by the instructor. English readers may derive from this book considerable amusement and at the same time obtain a number of useful hints as to the possibility of introducing to youthful students the chief tests used in examining water, milk, baking-powder, &c.

(6) The Italian volume is a translation of the well-known American text-book, and will therefore not be likely to circulate in this country. It is well printed and is presented in an attractive form.

T. M. L.

OUR BOOKSHELF.

The Theory of Evolution in the Light of Facts. By Karl Frank, S.J. With a chapter on Ant Guests and Termite Guests, by P. E. Wasmann. Translated from the German by C. T. Druery. Pp. xii+241. (London: Kegan Paul, Trench, Trübner and Co., Ltd., 1913.) Price 5*s*. net.

THE object of this book, as stated in its preface, is to substitute "pure postulates" for those which are referred to as "postulates of the theory of evolution," put forward by "many students of nature at the present day." As examples of these precious *pure postulates* we may cite the following: (*a*) The oldest known fossils represent the beginnings of life on the globe (p. 22). (*b*) The absence of *all* the intermediate forms between great groups indicates a "transformation and alteration of form rather than an actual higher evolution" (p. 76). (*c*) "We are not justified in bringing animals, like mammalia, birds, fishes and worms, into genetic connection with plants, like trees, ferns, and mosses" (p. 108). (This, we are told in the preface, is the *chief postulate.*) (*d*) Explanation of the origin of life is essential to any theory of evolution (pp. 83–108).

Starting from these "postulates," there is no difficulty in forecasting the author's conclusions. Indeed, but for the fact that some recent researches are referred to in order that they may be tortured into support of the author's views, we might imagine that we were reading one of the reviews of the "Origin of Species" written fifty years ago; and this idea would be confirmed as we come upon contemptuous and vituperative references to Darwin, Haeckel, and other men of science. Not having seen the German original of the book, we cannot say whether the inaccuracies, which abound in every part of it, are due to the author or the translator. Within the compass of a dozen lines we find "Quartiary," "Mussel Chalk," "Dyas (Perm.) = Permian Limestone and Old Red Sandstone," and "Algonkium = pre-Cambrian." Nor are we impressed, as we wade through misconceptions, misstatements, and misspellings, by the fact that the book bears the *Imprimatur + Johannes J. Glennon Archiepiscopus* ***Sti. Ludovici.***

The Story of a Hare. By J. C. Tregarthen. Pp. xi+199+plates. (London: John Murray, 1912.) Price 6*s*. net.

IN this life-story of a hare the author has successfully combined narrative with instruction. Most books on natural history for general readers are too informative and lack the living feeling which always commands a wide appeal. This touch, which makes the whole world kin, is largely a thing of sympathy, and no book on the life of a wild animal can be successful without it. Mr. Tregarthen possesses that attribute and has therefore written a book which will be appreciated by all lovers of wild animals and observers of their habits. He describes the life of a hare from birth to death from the point of view of the animal itself, and amid the scenes of a century ago. We have thus an account of the hare's habits and its struggles for existence in an attractive setting. The author has insight as well as sympathy, and his book should interest many readers.

Les Progrès Récents de l'Astronomie. By Prof. Paul Stroobant. Pp. 173. (Brussels: Hayez, Rue de Louvain, 112, 1912.)

PROF. STROOBANT'S annual *résumé* of the advances made in astronomy during the previous year is becoming a work of increasing usefulness to the astronomical reader; a wide range of subjects is treated concisely and with a discerning appreciation of relative importance. As usual, the review of 1911 is not restricted to observations only, but includes the recent advances in theory, such, for example, as Miller's and Störmer's papers on the mechanics of the corona and Birkeland's suggestions as to the formation of sun-spots. Tables of new variable stars (148), minor planets (now totalling 732) and new spectroscopic binaries (94), and several fine plates, add considerably to the value of the work.

W. E. R.